What is claimed is:

1. A p-type semiconductor comprising a localized band formation element which is isovalent with at least one of elements which compose the semiconductor and has smaller electronegativity than electronegativity of said element.

2. The p-type semiconductor according to Claim 1, further comprising an acceptor element which has fewer valence electrons than valence electrons of at least one of the elements which compose the semiconductor.

3. The p-type semiconductor according to Claim 2,
wherein amount of the localized band formation element is larger than amount of the acceptor element.

4. The p-type semiconductor according to Claim 3,
wherein the acceptor element has a lower energy level than a top of an energy band which the localized band formation element has.

5. The p-type semiconductor according to Claim 4,
wherein the acceptor element and the localized band formation element are distributed uniformly.

6. The p-type semiconductor according to Claim 5,
wherein amount of the localized band formation element is 2 atom % or less.

7. The p-type semiconductor according to Claim 6,
wherein the p-type semiconductor is a compound semiconductor.

8. The p-type semiconductor according to Claim 7, wherein the compound semiconductor is a nitride semiconductor.

9. The p-type semiconductor according to Claim 8, wherein the nitride semiconductor has at least one Group III elements including aluminum and at least one Group V element including nitrogen.

10. The p-type semiconductor according to Claim 9, wherein the acceptor element is at least one of carbon, silicon, germanium, tin, beryllium, magnesium, zinc and cadmium.

11. The p-type semiconductor according to Claim 10, wherein the localized band formation element is at least one of phosphorus, arsenic and antimony.

12. The p-type semiconductor according to Claim 8, wherein the nitride semiconductor is a compound semiconductor which has at least one Group III elements including boron and at least one Group V elements including nitrogen.

13. The p-type semiconductor according to Claim 7, wherein the compound semiconductor is an oxide semiconductor.

14. The p-type semiconductor according to Claim 13, wherein the oxide semiconductor is a compound semiconductor which has at least one Group II elements including zinc and at least one Group VI elements including oxygen.

15. The p-type semiconductor according to Claim 14,

wherein the acceptor element is at least one of nitrogen, phosphorus, arsenic and antimony.

16. The p-type semiconductor according to Claim 15,
wherein the localized band formation element is at least one of sulfur, selenium and tellurium.

17. The p-type semiconductor according to Claim 13,
wherein the oxide semiconductor is a compound semiconductor which has at least one Group II elements including beryllium and at least one Group VI elements including oxygen.

18. The p-type semiconductor according to Claim 3,
wherein energy gap between an energy level which the acceptor element has and a top of an energy band which the localized band formation element has is higher than thermal energy at temperature when said semiconductor is used.

19. The p-type semiconductor according to Claim 2,
wherein a part including the acceptor element and a part including the localized band formation element are separated spatially.

20. The p-type semiconductor according to Claim 19,
wherein the part including the acceptor element and the part including the localized band formation element are different semiconductors.

21. The p-type semiconductor according to Claim 20,
wherein the part including the acceptor element and the part including the localized band formation element are semiconductors with different crystal structures.

22. The p-type semiconductor according to Claim 1,

wherein the p-type semiconductor is a nitride semiconductor which has a crystal defect caused by missing of a Group III element, and

the localized band formation element is at least one of phosphorus, arsenic and antimony.

23. The p-type semiconductor according to Claim 1, further comprising an acceptor element which has fewer valence electrons than valence electrons of at least one of the elements which compose the semiconductor,

wherein the acceptor element has a lower energy level than a top of an energy band which the localized band formation element has.

24. The p-type semiconductor according to Claim 1, further comprising an acceptor element which has fewer valence electrons than valence electrons of at least one of the elements which compose the semiconductor,

wherein the acceptor element and the localized band formation element are distributed uniformly.

25. The p-type semiconductor according to Claim 1,

wherein amount of the localized band formation element is 2 atom % or less.

26. The p-type semiconductor according to Claim 1,

wherein the p-type semiconductor is a compound semiconductor.

27. The p-type semiconductor according to Claim 1,

wherein the p-type semiconductor is a nitride semiconductor.

28. The p-type semiconductor according to Claim 1,

wherein the p-type semiconductor is the nitride semiconductor which has at least one Group III elements including aluminum and at least one Group V element including nitrogen.

29. The p-type semiconductor according to Claim 1,

wherein the p-type semiconductor is a nitride semiconductor which includes an acceptor element which has fewer valence electrons than valence electrons of at least one of the elements which compose the semiconductor, and

the acceptor element is at least one of carbon, silicon, germanium, tin, beryllium, magnesium, zinc and cadmium.

30. The p-type semiconductor according to Claim 1,

wherein the p-type semiconductor is a nitride semiconductor, and

the localized band formation element is at least one of phosphorus, arsenic and antimony.

31. The p-type semiconductor according to Claim 1,

wherein the p-type semiconductor is a nitride semiconductor which has at least one Group III elements including boron and at least one Group V elements including nitrogen.

32. The p-type semiconductor according to Claim 1,

wherein the p-type semiconductor is an oxide semiconductor.

33. The p-type semiconductor according to Claim 1,

wherein the p-type semiconductor is an oxide semiconductor which has at least one Group II elements including zinc and at least

one Group VI elements including oxygen.

34. The p-type semiconductor according to Claim 1,

wherein the p-type semiconductor is an oxide semiconductor which includes an acceptor element which has fewer valence electrons than valence electrons of at least one of the elements which compose the semiconductor, and

the acceptor element is at least one of nitrogen, phosphorus, arsenic and antimony.

35. The p-type semiconductor according to Claim 1,

wherein the compound semiconductor is an oxide semiconductor, and

the localized band formation element is at least one of sulfur, selenium and tellurium.

36. The p-type semiconductor according to Claim 1,

wherein the p-type semiconductor is an oxide semiconductor which has at least one Group II elements including beryllium and at least one Group VI elements including oxygen.

37. The p-type semiconductor according to Claim 1, further comprising an acceptor element which has fewer valence electrons than valence electrons of at least one of the elements which compose the semiconductor,

wherein energy gap between an energy level which the acceptor element has and a top of an energy band which the localized band formation element has is higher than thermal energy at temperature when said semiconductor is used.

38. A semiconductor device having a layered structure which composes semiconductor layers which includes a p-type

semiconductor layer,

wherein the p-type semiconductor includes a localized band formation element which is isovalent with at least one of elements which compose the p-type semiconductor and has smaller electronegativity than said element.

39. The semiconductor device according to Claim 38,

wherein the p-type semiconductor contacts with an electrode with a junction.

40. The semiconductor device according to Claim 39,

wherein a top of a valence band of a semiconductor contacted to the p-type semiconductor is lower than a bottom of an energy band which the localized band formation element has in the p-type semiconductor.

41. The semiconductor device according to Claim 39,

wherein energy gap between a top of a valence band of a semiconductor contacted to the p-type semiconductor and a bottom of an energy band which the localized band formation element has in the p-type semiconductor is smaller than thermal energy at temperature when said semiconductor is used.

42. The semiconductor device according to Claim 38,

wherein said semiconductor device is a light-emitting semiconductor device.

43. The semiconductor device according to Claim 38,

wherein a top of a valence band of a semiconductor contacted to the p-type semiconductor is lower than a bottom of an energy band which the localized band formation element has in the p-type semiconductor.

44. The semiconductor device according to Claim 38,

wherein energy gap between a top of a valence band of a semiconductor contacted to the p-type semiconductor and a bottom of an energy band which the localized band formation element has in the p-type semiconductor is smaller than thermal energy at temperature when said semiconductor is used.

45. A hetero-junction semiconductor material comprising:

a p-type semiconductor layer; and

a target material layer which contacts with the p-type semiconductor layer with a junction and where holes are implanted from the p-type semiconductor layer,

wherein the p-type semiconductor layer includes:

an acceptor element which has fewer valence electrons than at least one of elements which compose the p-type semiconductor layer, and

a localized band formation element which is isovalent with at least one of elements which compose the p-type semiconductor layer and has smaller electronegativity than said element, and

the target material layer includes one constituent element which has smaller electron affinity than at least one of elements which compose the p-type semiconductor layer.

46. The hetero-junction semiconductor material according to Claim 45,

wherein the localized band formation element has an energy band at same or lower energy level than energy at a top of a valence band of the target material layer.

47. The hetero-junction semiconductor material according to Claim 46,

wherein the target material layer further includes the acceptor element.

48. The hetero-junction semiconductor material according to Claim 47,

wherein the p-type semiconductor layer has a smaller lattice constant than a lattice constant of the target material layer and a tensile distortion at a junction part between the p-type semiconductor layer and the target material layer.

49. The hetero-junction semiconductor material according to Claim 48,

wherein the p-type semiconductor layer has a different crystal structure from a crystal structure of the target material layer.

50. The hetero-junction semiconductor material according to Claim 49,

wherein there is no defect or dangling bond in a junction part between the p-type semiconductor layer and the target material layer.

51. The hetero-junction semiconductor material according to Claim 50,

wherein in a junction part between the p-type semiconductor layer and the target material layer, one or both of plane directions of the both layers and a direction of atomic arrangements in a plane are different.

52. The hetero-junction semiconductor material according to Claim 51,

wherein the p-type semiconductor has an amorphous

structure or a polycrystalline structure.

53. The hetero-junction semiconductor material according to Claim 52,

wherein the target material layer is an n-type semiconductor layer with high concentration.

54. The hetero-junction semiconductor material according to Claim 53,

wherein the target material layer is an aluminum indium gallium nitrogen layer; amount of indium is 0~100% and amount of aluminum is 0~100%.

55. The hetero-junction semiconductor material according to Claim 54,

wherein the p-type semiconductor layer is a nitride semiconductor layer.

56. The hetero-junction semiconductor material according to Claim 55,

wherein the target material layer is a gallium nitride layer and the p-type semiconductor layer is a boron aluminum gallium nitrogen layer; amount of boron is 0~100% and amount of gallium is 0~100%.

57. The hetero-junction semiconductor material according to Claim 56,

the p-type semiconductor layer is an aluminum nitride layer and the localized band formation element is phosphorus or arsenic.

58. The hetero-junction semiconductor material according to Claim 47, further comprising an intermediate layer where

compositions of the p-type semiconductor layer and the target material layer mix between the p-type semiconductor and the target material layer.

59. The hetero-junction semiconductor material according to Claim 45,

wherein the p-type semiconductor layer is an oxide semiconductor layer.

60. The hetero-junction semiconductor material according to Claim 45,

wherein the p-type semiconductor layer is a fluoride semiconductor layer.

61. The hetero-junction semiconductor material according to Claim 45,

wherein the p-type semiconductor layer is a buffer layer.

62. A semiconductor device comprising a semiconductor device according to Claim 45,

wherein the target material layer further includes the acceptor element.

63. The hetero-junction semiconductor material according to Claim 45,

wherein the p-type semiconductor layer has a smaller lattice constant than a lattice constant of the target material layer and a tensile distortion at a junction part between the p-type semiconductor layer and the target material layer.

64. The hetero-junction semiconductor material according to Claim 45,

the p-type semiconductor layer has a different crystal structure from a crystal structure of the target material layer.

65. The hetero-junction semiconductor material according to Claim 45,

wherein there is no defect or dangling bond in a junction part between the p-type semiconductor layer and the target material layer.

66. The hetero-junction semiconductor material according to Claim 45,

wherein in a junction part between the p-type semiconductor layer and the target material layer, one or both of plane directions of the both layers and a direction of atomic arrangements in a plane are different.

67. The hetero-junction semiconductor material according to Claim 45,

wherein the p-type semiconductor has an amorphous structure or a polycrystalline structure.

68. The hetero-junction semiconductor material according to Claim 45,

wherein the target material layer is an n-type semiconductor layer with high concentration.

69. The hetero-junction semiconductor material according to Claim 45,

wherein the target material layer is an aluminum indium gallium nitrogen layer; amount of indium is 0~100% and amount of aluminum is 0~100%.

70. The hetero-junction semiconductor material according to Claim 45,

wherein the target material layer is an aluminum indium gallium nitrogen layer; amount of indium is 0~100% and amount of aluminum is 0~100%, and

the p-type semiconductor layer is a nitride semiconductor layer.

71. The hetero-junction semiconductor material according to Claim 45,

wherein the target material layer is a gallium nitride layer and the p-type semiconductor layer is a boron aluminum gallium nitrogen layer; amount of boron is 0~100% and amount of gallium is 0~100%.

72. The hetero-junction semiconductor material according to Claim 45,

wherein the target material layer is a gallium nitride layer, and

the p-type semiconductor layer is an aluminum nitride layer and the localized band formation element is phosphorus or arsenic.

73. The hetero-junction semiconductor material according to Claim 45, further comprising an intermediate layer where compositions of the p-type semiconductor layer and the target material layer mix between the p-type semiconductor and the target material layer.

74. A semiconductor device comprising hetero-junction semiconductor material,

wherein the hetero-junction semiconductor material includes:

a p-type semiconductor layer; and

a target material layer which contacts with the p-type semiconductor layer with a junction and where holes are implanted from the p-type semiconductor layer,

the p-type semiconductor layer includes:

an acceptor element which has fewer valence electrons than at least one of elements which compose the p-type semiconductor layer; and

a localized band formation element which is isovalent with at least one of elements which compose the p-type semiconductor layer and has smaller electronegativity than said element, and

the target material layer includes one constituent element which has smaller electron affinity than at least one of elements which compose the p-type semiconductor layer.

75. A method for manufacturing a hetero-junction semiconductor material which is formed on a semiconductor substrate and includes a p-type semiconductor layer and a target material layer which contacts with the p-type semiconductor layer with a junction and where holes are implanted from the p-type semiconductor layer, the method comprising:

a semiconductor layer formation step of forming one or more semiconductor layers on the semiconductor substrate by a crystal growth method;

a p-type semiconductor formation step of forming the p-type semiconductor layer on the semiconductor layer by the crystal growth method; and

a target material layer forming step of forming the target material layer on the p-type semiconductor layer by the crystal growth method.

76. The method for manufacturing the hetero-junction

semiconductor material according to Claim 75,

wherein a p-type semiconductor layer, which the hetero-junction semiconductor material has, includes an acceptor element which has fewer valence electrons than at least one of elements which compose the p-type semiconductor layer and a localized band formation element which is isovalent with at least one of elements which compose the p-type semiconductor layer and has smaller electronegativity than said element, and

the method for manufacturing the hetero-junction semiconductor material further comprising a doping step of doping the localized band formation element and the acceptor element only to a part (depth: up to 0.1 μm) of the p-type semiconductor layer which contacts with the target material layer by ion implantation method or diffusion method.